REMARKS

Initially, Applicant expresses appreciation to the Examiner for the detailed Official Action provided. Furthermore, Applicant expresses appreciation for acknowledgment that the drawings are acceptable, for the acknowledgment of Applicant's Claim for Priority and receipt of the certified copy of the priority document, and for the acknowledgment of Applicant's Information Disclosure Statements (IDSs) filed on January 30, 2009, February 25, 2008, and August 10, 2006.

Upon entry of the present paper, claims 1 and 5 will have been amended. The herein-contained amendments should not be considered an acquiescence in the propriety of the outstanding rejection. Rather, Applicant has amended the claims solely to advance prosecution of the present application to allowance. Furthermore, it is submitted that no prohibited new matter is introduced by the amendments. Specifically, the amendments are supported at least by Figure 6 and page 11, lines 12-15 and page 15, lines 12-18 of the present application as filed on May 3, 2006 (¶[0043] and ¶[0065] of corresponding U.S. Appl. Pub. No. 2007/0140378). Thus, claims 1-3 and 5 are pending in the present application with claims 1 and 5 being in independent form.

Applicant addresses the pending rejection provided within the outstanding Official Action below and respectfully requests reconsideration and withdrawal thereof together with an indication of the allowability of claims 1-3 and 5 (*i.e.*, all pending claims) in the next Official communication. Such action is respectfully requested and is now believed to be appropriate for at least the reasons provided below.

35 U.S.C. § 103 Claim Rejections

In the outstanding Official Action, claims 1-3 and 5 were rejected under 35 U.S.C. § 103(a) as being unpatentable over European Pat. Appl. EP 1,120,944 to McVey (hereinafter "MCVEY") in view of U.S. Pat. No. 5,228,062 to Bingham (hereinafter "BINGHAM").

Applicant respectfully disagrees with the propriety of the outstanding rejection. Nonetheless, in order to advance prosecution of the present application to allowance, upon entry of the present application, independent claims 1 and 5 will have been amended to clarify the features recited therein. In this regard, Applicant respectfully traverses the outstanding rejection.

Amended independent claim 1 recites a quadrature modulation apparatus. With reference to Figure 6 as a non-limiting and exemplary embodiment of the present application, an in-phase correction signal outputter (32I) [1] generates an in-phase correction user signal by adding an in-phase user signal (I signal) to an in-phase correction signal of a sinusoidal voltage. An in-phase signal outputter (42I) generates an in-phase offset user signal by adding an in-phase voltage signal (ΔV) to the in-phase correction user signal. An in-phase signal converter (14I) outputs an in-phase conversion signal by mixing an in-phase local signal of a predetermined local frequency with the in-phase offset user signal.

A quadrature correction signal outputter (32Q) generates a quadrature correction user signal by adding a quadrature user signal (Q signal) to a quadrature correction signal, which is different in phase by approximately 90 degrees from the in-phase correction

---

[1] The reference numerals included herein are shown solely for exemplary and clarification purposes. The reference numerals are not to be considered limiting in any way.

signal. A quadrature signal outputter (42Q) generates a quadrature offset user signal by adding a quadrature voltage signal (ΔV) to the quadrature correction user signal. A quadrature signal converter outputs a quadrature conversion signal by mixing a quadrature local signal, which is different in phase by approxiamtely 90 degrees from the in-phase local signal, with the quadrature offset user signal.

An adder (18) adds the in-phase conversion signal to the quadrature conversion signal, an output voltage measurer (56) measures an output voltage of said adder; and an error determiner (62) determines an error of the quadrature modulation based upon a measurement result of said output voltage measurer.

In view of the above, Applicant respectfully submits that MCVEY and BINGHAM, whether considered alone or together in any proper combination thereof, fail to disclose or render obvious at least the: in-phase correction signal outputter that generates an in-phase correction user signal by adding an in-phase user signal to an in-phase correction signal of a sinusoidal voltage; and the quadrature correction signal outputter that generates a quadrature correction user signal by adding a quadrature user signal to a quadrature correction signal, which is different in phase by approximately 90 degrees from the in-phase correction signal. That is, Applicant respectfully submits that the combination of MCVEY and BINGHAM fails to disclose or render obvious at least the in-phase correction signal and the quadrature correction signal that are added to the in-phase user signal and the quadrature user signal, respectively, to generate the in-phase correction user signal and the quadrature correction user signal, respectively.

In the outstanding Official Action, it is asserted that the I OFFSET and Q OFFSET of MCVEY disclose the in-phase correction signal and the quadrature correction signal of the present application. Applicant respectfully disagrees.

As previously generally submitted, MCVEY discloses a modulation system for receiving an input signal 11 and outputting a modulated output signal 12 having an in-phase component I and a quadrature phase component Q (MCVEY, Figure 1). According to MCVEY, the input signal 11 includes I and Q data bit streams (MCVEY, ¶[0016]). Digital filters 16, 20 filter the input signal 11 into an I digital data stream 17 and Q digital data stream 21 (MCVEY, ¶[0017]). In one embodiment of MCVEY, the I digital data stream 17 passes directly into an I digital data stream 117 and the Q digital data stream passes directly into a Q digital data stream 121 (MCVEY, ¶[0018]). In an alternative embodiment, the I and Q digital data streams 17, 21 pass through an IQ rotator 100 to form the I and Q digital data streams 117, 121 (MCVEY, ¶[0018]).

According to MCVEY, an I offset adjustment summer 80 sums an I offset adjustment with the I digital data stream 117 while a Q offset adjustment summer 88 sums a Q offset adjustment with the Q digital data stream 121 (MCVEY, ¶[0029]). An oscillator 34 generates a constant wavelength (CW) signal at a predetermined frequency, and a ninety degree splitter 36 splits the CW signal into an I CW signal and a Q CW signal wherein the Q CW signal is in quadrature with the I CW signal (MCVEY, ¶[0020]). An I mixer 38 modulates the I CW signal with the adjusted I digital data stream 117 to issue an I modulated signal while a Q mixer 42 modulates the Q CW signal with the adjusted Q digital data stream 121 to issue a Q modulated signal (MCVEY, ¶[0020]). A

summer combines the I modulated signal with the Q modulated signal to provide a modulated output signal 12 (MCVEY, ¶[0020]).

The modulated output signal 12 includes several errors, such as CW carrier signal leakage, termed I and Q offsets (MCVEY, ¶[0024]). In this regard, an IQ correction code 46 generates the magnitudes of the I offset adjustment and the Q offset adjustment to correct the I offset and the Q offset.

In the previous outstanding Official Action and the outstanding Official Action it is asserted that the I OFFSET (*i.e.*, the I offset adjustment) the Q OFFSET (*i.e.*, Q offset adjustment) of MCVEY correspond, respectively, to the in-phase correction signal and quadrature correction signal of the present application.

Applicant disagrees. Rather, as clearly noted above and disclosed by MCVEY, the I offset adjustment summer 80 sums the I offset adjustment with the I digital data stream 117 to correct the I offset while the Q offset adjustment summer 88 sums the Q offset adjustment with the Q digital data stream 121 to correct the Q offset (MCVEY, ¶[0029]). In other words, the I offset adjustment of MCVEY is added to correct the I offset (i.e., the local leak), while the Q offset adjustment is added to correct the Q offset (i.e., the local leak).

In this regard, with respect to amended independent claim 1, as disclosed by page 21, ¶1 of the present application as filed (¶[0091] of corresponding U.S. Pat. Appl. Pub. No. 2007/0140378), the in-phase voltage signal outputter (42I) outputs an in-phase voltage signal (ΔV) so as to restrain the local leak of the in-phase signal converter 14I while the quadrature voltage signal outputter (42Q) outputs a quadrature voltage signal (ΔV) to correct the local leak of the quadrature signal converter 14Q.

9

Thus, it is respectfully submitted that the I offset adjustment (*i.e.*, I OFFSET) and the Q offset adjustment (*i.e.*, Q OFFSET) of MCVEY correspond to the in-phase voltage signal (ΔV) and the quadrature voltage signal (ΔV) of amended independent claim 1, and not the in-phase correction signal and the quadrature correction signal.

In this regard, the in-phase correction signal and the quadrature correction signal are added, respectively, to an in-phase user signal (I signal) and a quadrature user signal (*i.e.*, Q signal) for determining an error of a quadrature modulation (*see* page 12, line 14 to page 14, line 26 of the present application as filed (¶¶[0048]-[0059] of corresponding U.S. Pat. Appl. Pub. No. 2007/0140378) for an exemplary and non-limiting method for determining the error of the quadrature modulation on the basis of the in-phase correction signal and the quadrature correction signal).

Applicant respectfully submits that MCVEY fails to disclose or render obvious such signals. That is, it is submitted that the I offset adjustment (*i.e.*, I OFFSET) and the Q offset adjustment (*i.e.*, Q OFFSET) which are added to the I offset and the Q offset, respectively, for correcting a local leak fail to disclose or render obvious the in-phase correction signal and the quadrature correction signal of amended independent claim 1 that are added to the in-phase user signal and the quadrature user signal, respectively, to generate the in-phase correction user signal and the quadrature correction user signal, respectively.

In this regard, according to amended independent claim 1, the in-phase correction signal and the quadrature correction signal are added to the in-phase user signal and the quadrature user signal, and, then, the in-phase voltage signal and quadrature voltage signal are added to the corrected in-phase user signal (*i.e.* the in-phase correction user

signal) and the corrected quadrature user signal (*i.e.*, the quadrature correction user signal) for restraining the local leaks. Applicant respectfully submits that MCVEY fails to disclose or rendering obvious adding correction signals, as recited in the claimed combination of amended independent claim 1, to the I digital data stream 17 and the Q digital data stream 21 in addition to adding the I offset adjustment (*i.e.*, I OFFSET) and the Q offset adjustment (*i.e.*, Q OFFSET).

With respect to BINGHAM, Applicant respectfully submits that BINGHAM fails to cure the deficiencies of MCVEY. Rather, BINGHAM is merely relied upon to allegedly disclose the feature of creating a correcting signal with a sinusoidal voltage.

Accordingly, at least in view of the above, Applicant respectfully submits that MCVEY and BINGHAM, whether considered alone or together in any proper combination thereof, fail to disclose or render amended independent claim 1. Furthermore, it is submitted that amended independent 5 recites a quadrature modulation method including a similar combination of features as independent claim 1, and thus, that amended independent claim 5 is similarly not rendered obvious by the combination of MCVEY and BINGHAM for at least the reasons discussed *supra*.

With respect to the rejection of dependent claims 2-3, Applicant submits that these claims are each directly dependent from independent claim 1, which is allowable for at least the reasons discussed *supra*. Thus, these dependent claims are submitted to also be allowable for at least the reasons discussed *supra*. Furthermore, all dependent claims recite additional features which further define the present invention over the references of record.

At least in view of the above, Applicant respectfully submits that each and every pending claim of the present application (*i.e.*, claims 1-3 and 5) meets the requirements for patentability. Accordingly, the Examiner is respectfully requested to withdraw the outstanding objection and rejections and to indicate the allowance of each and every pending claim in the present application.

CONCLUSION

In view of the fact that none of the art of record, whether considered alone, or in any proper combination thereof, discloses or renders obvious the present invention as now defined by the pending claims, and in further view of the above amendments and remarks, reconsideration of the outstanding rejection and allowance of the present application are respectfully requested and are now believed to be appropriate.

Applicant notes that this amendment is being made to advance prosecution of the application to allowance, and should not be considered as surrendering equivalents of the territory between the claims prior to the present amendment and the amended claims. Further, no acquiescence as to the propriety of the outstanding rejection is made by the present amendment. All amendments to the claims which have been made in this amendment, and which have not been specifically noted to overcome a rejection based upon the prior art, should be considered to have been made for a purpose unrelated to patentability, and no estoppel should be deemed to attach thereto.
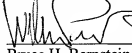
Additionally, Applicant notes that the status of the present application is after final rejection, and that once a final rejection has issued, an Applicant does not have a right to amend an application. Nevertheless, pursuant to M.P.E.P. §714.13, Applicant contends that entry of the present amendment is appropriate because the proposed amended claims avoid the rejections set forth in the last Official Action, resulting in the application being placed in condition for allowance, or alternatively, the revised claims place the application in better condition for purposes of appeal. Further, the revised claims do not present any new issues that would require any further consideration or search by the

Examiner and do not present any additional claims without cancelling a like number of pending claims. Accordingly, entry of the present amendment is respectfully requested.

Should the Commissioner determine that an extension of time is required in order to render this response timely and/or complete, a formal request for an extension of time, under 37 C.F.R. §1.136(a), is herewith made in an amount equal to the time period required to render this response timely and/or complete. The Commissioner is authorized to charge any required extension of time fee under 37 C.F.R. §1.17 to Deposit Account No. 19-0089.

If there should be any questions concerning this application, the Examiner is invited to contact the undersigned at the telephone number listed below.

Respectfully submitted,
Takachi KATO

Bruce H. Bernstein
Reg. No. 29027

William Pieprz
Reg. No. 33,630

June 9, 2010
GREENBLUM & BERNSTEIN, P.L.C.
1950 Roland Clarke Place
Reston, VA 20191
(703) 716-1191